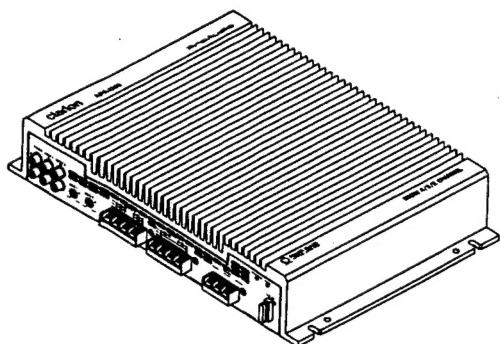


# clarion Service Manual

Published by Service Dept.



## 4-CHANNEL CAR AUDIO AMPLIFIER

Model **APA4200**  
(GA-952B:U.S.A.)  
(GA-952E:EUROPEAN)

### ■ SPECIFICATIONS

Maximum power output	:320watts(80 watts per channel)
Continuous average power output	:50 watts per channel into 4ohms; 20Hz to 20kHz at 0.02% THD
Frequency response(-1 dB)	:10Hz to 50 kHz
Signal to noise ratio(A-wtd)	:110dB
Input sensitivity(at rated output)	:200mV to 3 V
Current consumption(at full output)	:30 amps
Speaker load capacity	:2 ohms
Dimensions	:367mm(Width) 68mm(Height) 250mm(Depth)
Weight	:5.8kg

### ■ COMPONENTS

● GA-952B-51/E-51		
Main unit	—	1
Power cord	850-2710-00	1
Ground cord	840-0523-00	1
Flat terminal	321-1002-00	9
Sleeve	348-0258-00	9
Tapping screw	716-1705-00	4
Plate nut	725-0242-00	4
Cord clamp	335-0833-06	5
Terminal cover(3P)	345-7588-00	1
Terminal cover(4P)	345-7587-00	2

### ■ FEATURES

- Continuous average power output:200W  
(4 x 50W into 4 ohms, 20Hz-20kHz, 0.02% THD)
- Power guard distortion limiting circuit
- Pulse-width regulated MOS-FET power supply
- Mixed mode operation
- Bridgeable for 2-, 3- or 4-channel mode operation
- Selectable 90Hz/140Hz, -24dB/oct. low pass filter
- 2-ohm load capability in stereo drive
- Overheating, DC voltage, speaker lead short-circuit protection circuits
- Isolated earthing input

※ For Improvement purposes, specifications and design are subject to change without prior notice.

## ■ OPERATION

### Connections For Inputs/Speakers/Power

The front panel of each APA-series amplifier contains one or two external fuses and connections for inputs, speakers, and power, as shown in Figures 4 and 5.

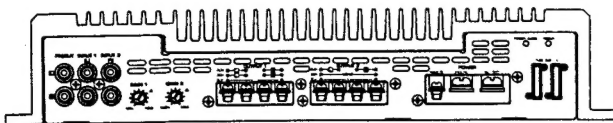


Figure 4. The front panel of the APA4400 contains 4-channel connections for inputs, speakers, and power. The APA4200 (not shown) has a similar layout, but is protected by a single 30 A fuse.

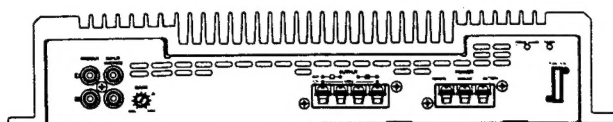


Figure 5. The front panel of the APA2100 contains 2-channel connections for inputs, speakers, and power.

For the APA4400 and APA4200, the gold-plated RCA stereo input jacks are labeled as L/R INPUT 1 (front) and INPUT 2 (rear). On the APA2100 2-channel amplifier, stereo inputs are labeled as L INPUT and R INPUT (with only the L INPUT being active when CHANNELS is set to MONO).

Stereo GAIN controls are located next to each set of inputs. Triangular markings denote optimum gain settings when interconnecting an optional PEQ2040 2-channel, 4-band parametric equalizer.

All three models have an additional set of jacks labeled as L/R PREOUT. For the APA4400 and APA4200 amplifiers, the L/R PREOUT jacks carry full-frequency signals present on INPUT 1. As an application, you can use this convenient feature instead of "Y" connectors to route INPUT 1 audio to another amplifier.

The speaker terminals on all models are gold-plated with markings for LEFT/RIGHT and BRIDGED (mono) connections. For the APA4400 and APA4200, there are additional markings that describe connections for 4-, 3-, and 2-channel operation.

The power terminals on all models are also gold-plated power and are labeled as REMOTE (remote turn-on), GROUND, and BATTERY (+12 Vdc). External automotive-type fuses protect amplifier circuits. The APA4400 uses two 30 A fuses, the APA4200 is protected by a single 30 A fuse, and the APA2100 uses a 20 A fuse.

All models include two indicators. POWER GUARD lights whenever the distortion limiting circuit is active. POWER confirms that dc power is reaching the amplifier.

## APPLICATIONS

The Clarion APA4400, APA4200, and APA2100 car audio amplifiers can be used in a variety of system applications. We've enclosed several example systems to help plan your own installation (see Figures 6 through 12).

### 4-Channel Full-Range Stereo System

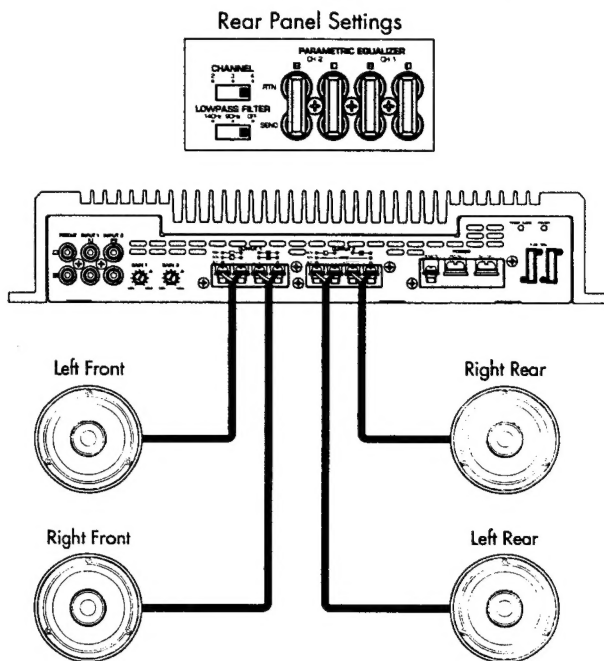


Figure 6. In this application, an APA4400 is used as a 4-channel amplifier that drives four full-range stereo speakers at 100 watts per channel. Using an APA4200 provides 50 watts per channel.

### 4-Channel Stereo System 2-Ch High Pass, 2-Ch Low Pass

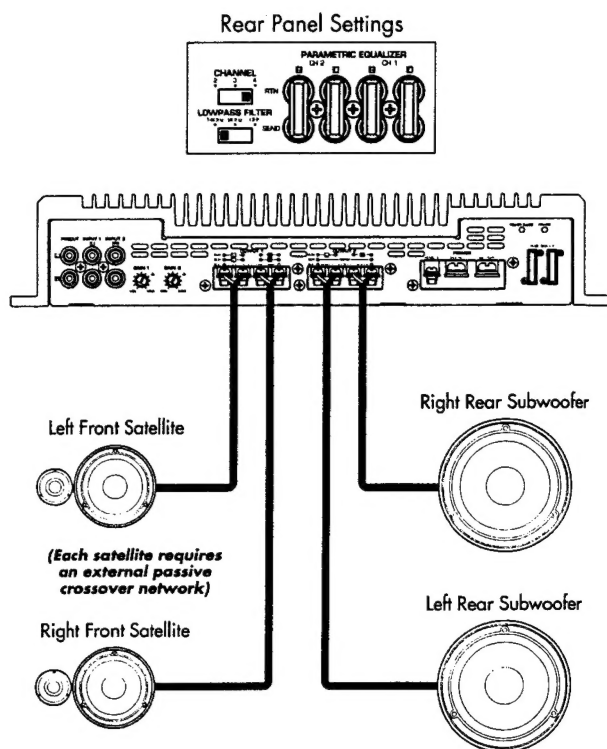


Figure 7. In this 4-channel system, an APA4400 (or APA4200) drives a pair of stereo satellites for the front and a pair of stereo subwoofers for the rear. Note the filter settings for this application.

## 2-Channel Stereo System With Low-Pass Bridged-Mono Channel

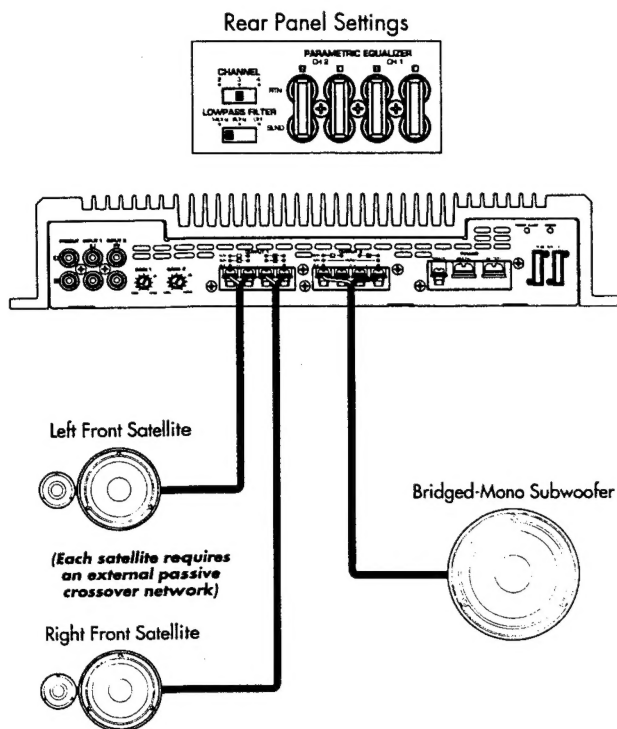


Figure 8. An APA4400 (or APA4200) can also be configured to drive a stereo pair of stereo satellites for the front and a single mono subwoofer for the rear. Note the filter settings and connections.

## 2-Channel High Power Systems

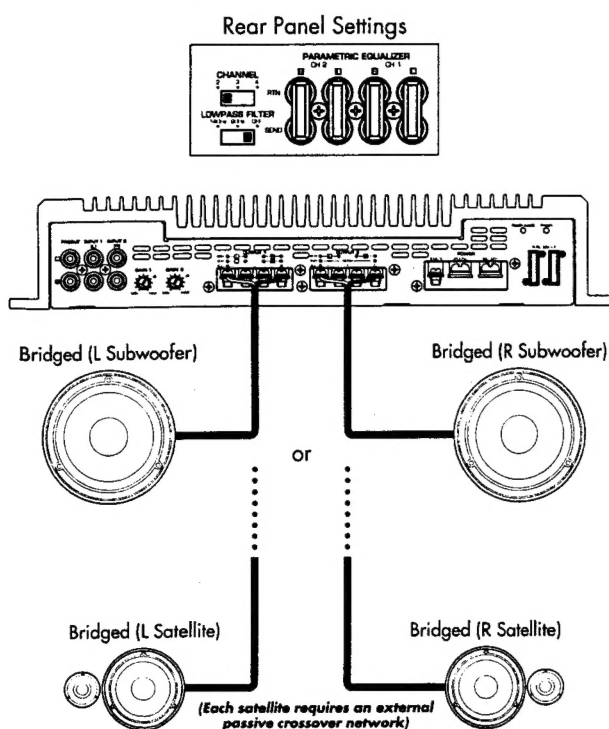


Figure 9. An APA4400 (or APA4200) can be set up as a 2-Channel amplifier to drive a pair of subwoofers (or satellites) with 200 watts per channel (100 watts per channel for the APA4200). With an APA2100 2-channel amplifier, simply connect the left/right outputs to speakers.

## Mixed-Mode System On Rear Full-Range Speakers On Front

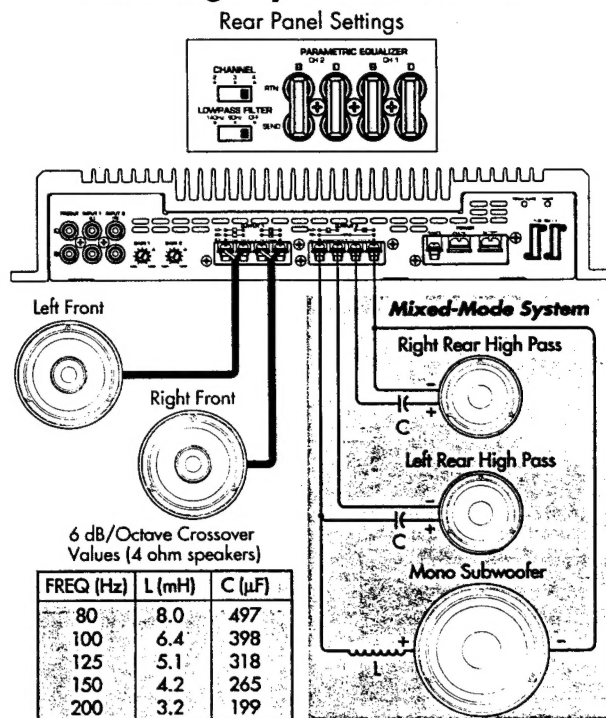


Figure 10. An APA4400 (or APA4200) can be configured for mixed-mode operation with OUTPUT 1 in stereo and OUTPUT 2 in mono. The component table provides optimum values to create a 6 dB/octave crossover at specified frequencies (i.e., do not overlap high and low frequencies). Use components that have a  $\pm 5\%$  tolerance and capacitors rated at 100V.

## INSTALLATION

This section lists mounting and wiring precautions for installing a Clarion APA4400, APA4200, or APA2100 car audio amplifier. Combined with the experience of a professional installer, these safeguards provide enough detail to successfully complete an installation. **If you do not have the necessary skills, do not install the amplifier yourself.** Instead, see your authorized Clarion dealer for installation recommendations.

### Mounting Precautions

Although a Clarion APA-series amplifier has large heat sinks and multi-level protection circuits, mounting any amplifier in a confined space without air movement can still damage internal circuits over time. Choose a site that provides adequate ventilation around the amplifier. For easy system set up, mount the amplifier so the controls and fuses will be accessible after installation.

In addition, observe these precautions:

- For the most efficient cooling, mount the amplifier so cool air runs along the length of the fins, rather than across them. Remember, any moving air will dissipate heat.
- Mount the amplifier on a rigid surface. Do not install the amplifier on plastic or other combustible material.
- Prior to drilling, make sure proposed mounting holes will not cut into the fuel tank, fuel lines, brake lines (under chassis), or electrical wiring.

### Wiring Precautions

- Read all wiring precautions. If you are not sure of the connections, contact your authorized Clarion dealer.
- Before installation, make sure the source unit power switch is in the OFF position.
- Disconnect the negative (-) lead at the battery before making any power connections.

- ◆ When making connections, be sure that each connection is clean and secure. Insulate final connections with electrical tape or shrink tubing. Failure to do so may damage your equipment.
- ◆ A secure, clean ground connection is critical to the performance of your Clarion car audio amplifier. Use the shortest ground wire possible to minimize resistance and avoid noise problems.
- ◆ Add an external fuse on the positive (+) power lead and connect it as close as possible to the vehicle's (+) battery terminal. Use a rating that equals the total current consumption at full output of all amplifiers in the system. Adding an external fuse will protect the electrical system from short circuits that can cause a fire.
- ◆ Refer to Figures 13 and 14 (on the next page) when making electrical connections. Connect the amplifier's positive (+) power lead via a fuse directly to the battery's positive (+) terminal. Do not connect this wire to the car's fuse panel. Use red-insulated 12 gauge (or larger) wire for the amplifier's positive (+) power lead and the same gauge black-insulated wire for the ground.

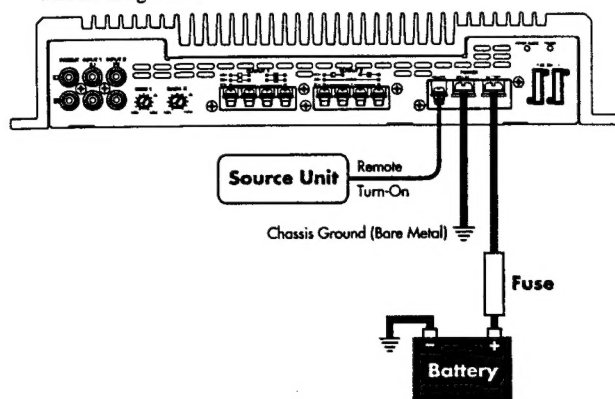


Figure 13. Electrical connections for an APA4400 or APA4200 amplifier.

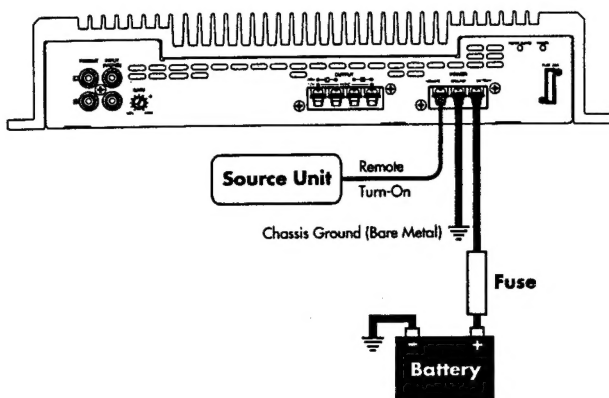


Figure 14. Electrical connections for an APA2100 amplifier.

- ◆ When replacing the amplifier's fuse, always use one having the same current rating. Substituting a higher-rated fuse can reduce protection and may result in serious damage to the amplifier.
- ◆ Never ground the speakers to the vehicle chassis or body.
- ◆ Make sure that your vehicle's electrical system (i.e., alternator, battery, etc.) is capable of handling the additional load. If you are planning a multi-amplifier system, you may need to add a second battery and possibly upgrade the alternator with a higher-output-rated model. Consult your authorized Clarion dealer for recommendations.
- ◆ To avoid possible noise problems, run the amplifier's positive (+) power lead along one side of the vehicle to the battery. Run the remote turn-on wire and RCA audio cables down the center, and route the speaker wires along the remaining side. If wires must cross, run them perpendicular to each other.

- ◆ When creating passage holes for the power wire, use grommets to eliminate any sharp edges created during drilling. This will protect the wire from being nicked and causing a short circuit.
- ◆ Extra cable can cause signal loss and act as an "antenna" for noise. Use only high-quality RCA cables that are no longer than necessary to make a direct connection with the source unit or equalizer.
- ◆ Depending on the type of system being installed, refer to the examples in Figures 6 through 12 (starting on page 9) for information on wiring and setting the operation mode.
- ◆ If your system plan includes an (optional) Clarion PEQ2040 2-channel, 4-band parametric equalizer, you'll need to remove the amplifier's shorting plugs (with power off) to connect the PEQ2040, as shown in Figure 15. Also read the PEQ2040 Installation and Operation Guide.

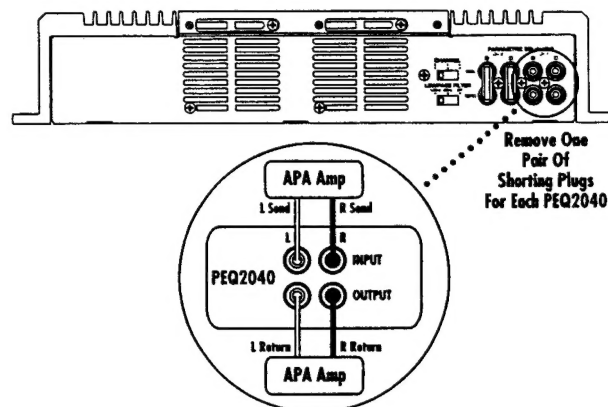


Figure 15. When interconnecting a PEQ2040, turn off power to the APA-series amplifier and remove its shorting plugs.

## SETTING GAIN

After completing the installation, follow these steps to set the APA4400 (or APA4200 or APA2100) GAIN controls, adjust the optional Clarion PEQ2040 equalizer(s), and then perform the final system checks.

**IMPORTANT: The procedure for setting gain on the APA4400 (or APA4200 or APA2100) is completely different than for any other amplifier on the market. Please be sure to follow the steps below exactly.**

1. Turn all amplifier GAIN controls to their MIN (minimum) positions.
2. Turn the vehicle's ignition switch to the ON position. Then turn the ON/OFF switch on the source unit to the ON position.
3. Set all tone or equalization controls on the source unit and optional PEQ2040 equalizer(s) to "flat" or "0" positions and turn loudness off. Then, play a CD or tape and set the volume control at 75% of full level.
4. Verify that the POWER indicator on the amplifier is on.

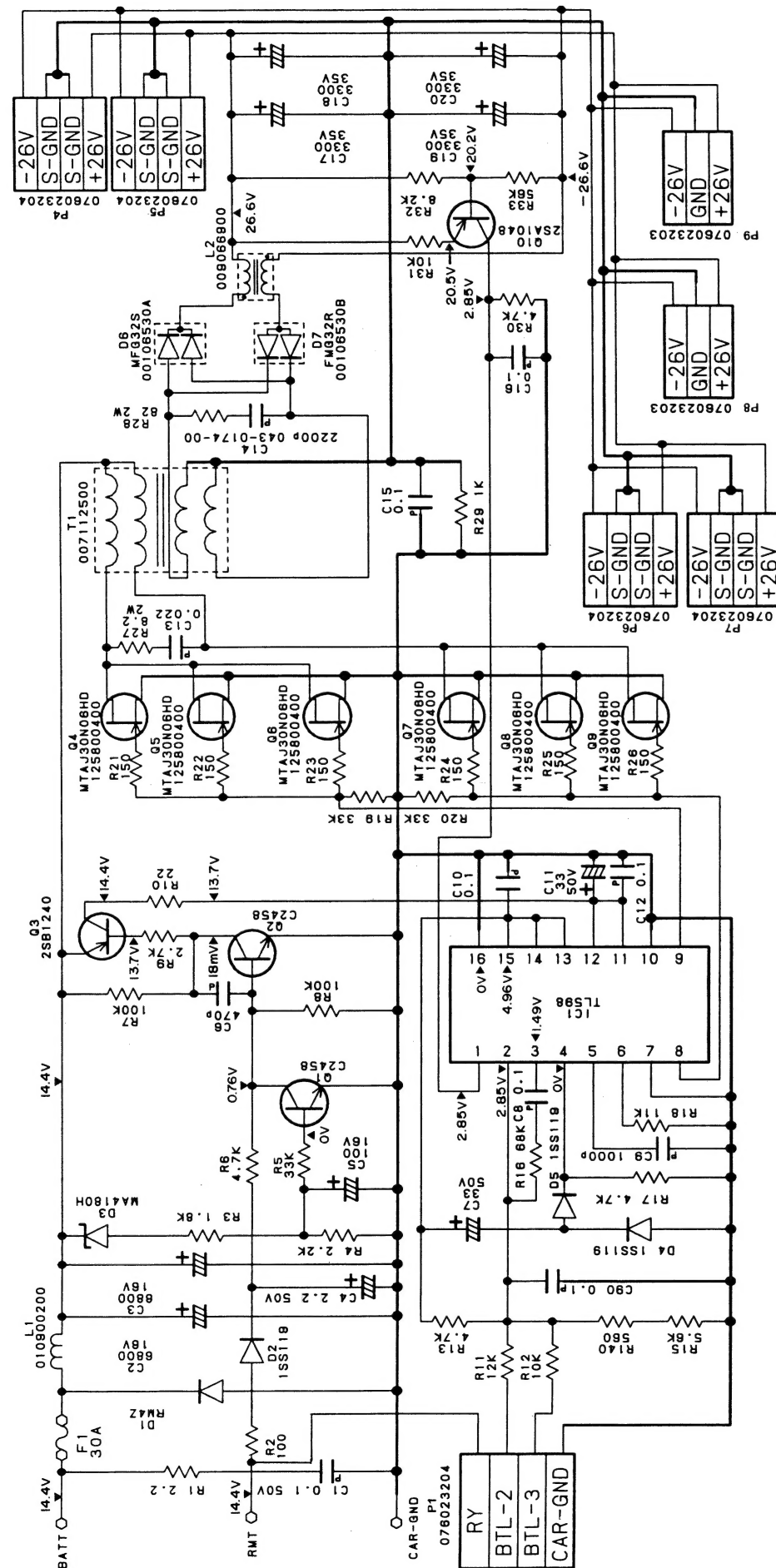
**NOTE: If the system uses an equalizer, set its frequency controls to "flat" or "0" positions.**

5. For the APA4400 or APA4200, set the fader control (on the source unit) to full front and slowly increase the INPUT 1 GAIN control for the front amplifiers (Channels 1 and 2). Stop when you see the Power Guard LED just begin to flicker (i.e., 20% of the time). Set the fader to full rear and repeat this step for the rear amplifier by adjusting the INPUT 2 GAIN.

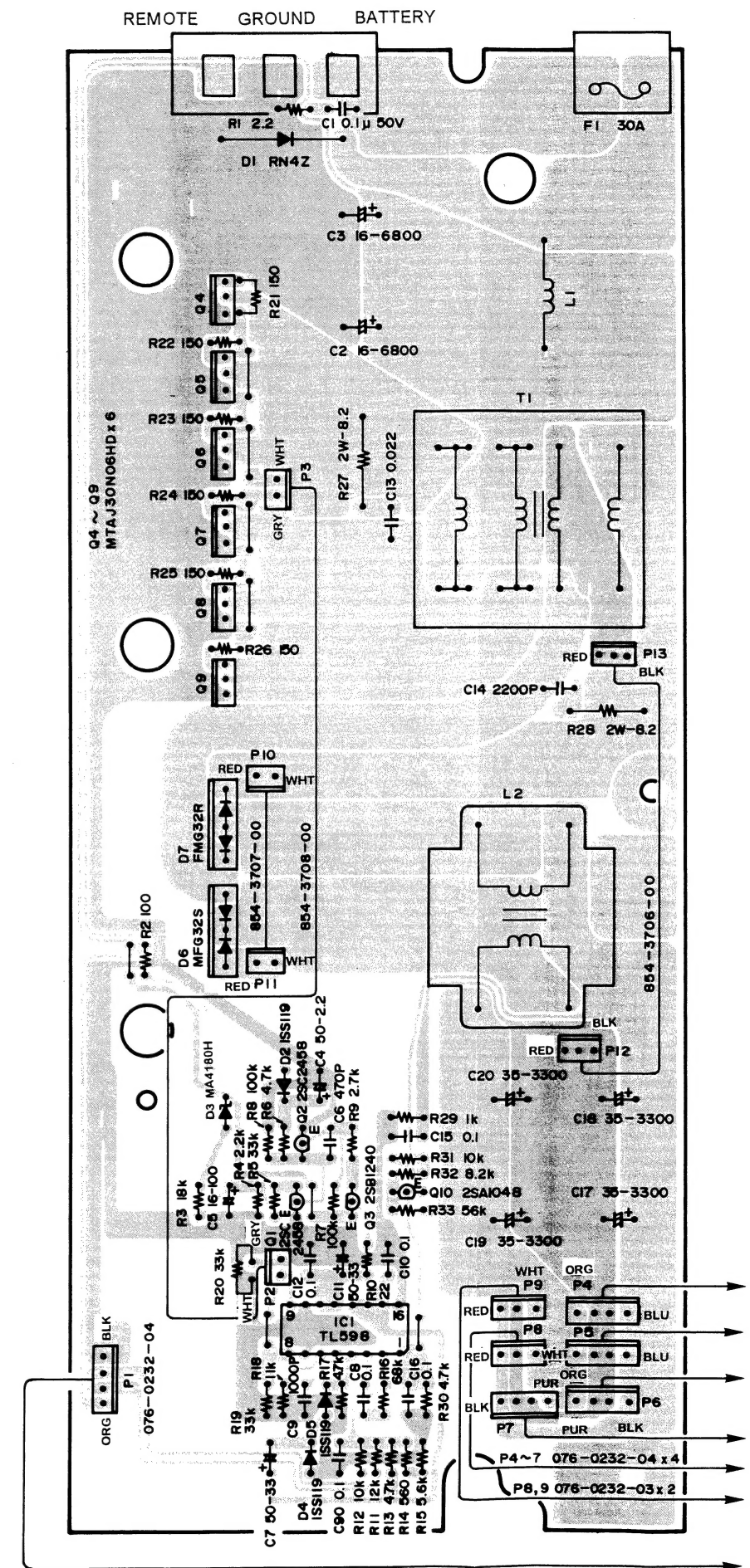
For the APA2100, set the fader control (on the source unit) to feed the amplifier at full level. Slowly increase the GAIN. Stop when you see the Power Guard LED just begin to flicker (i.e., 20% of the time).



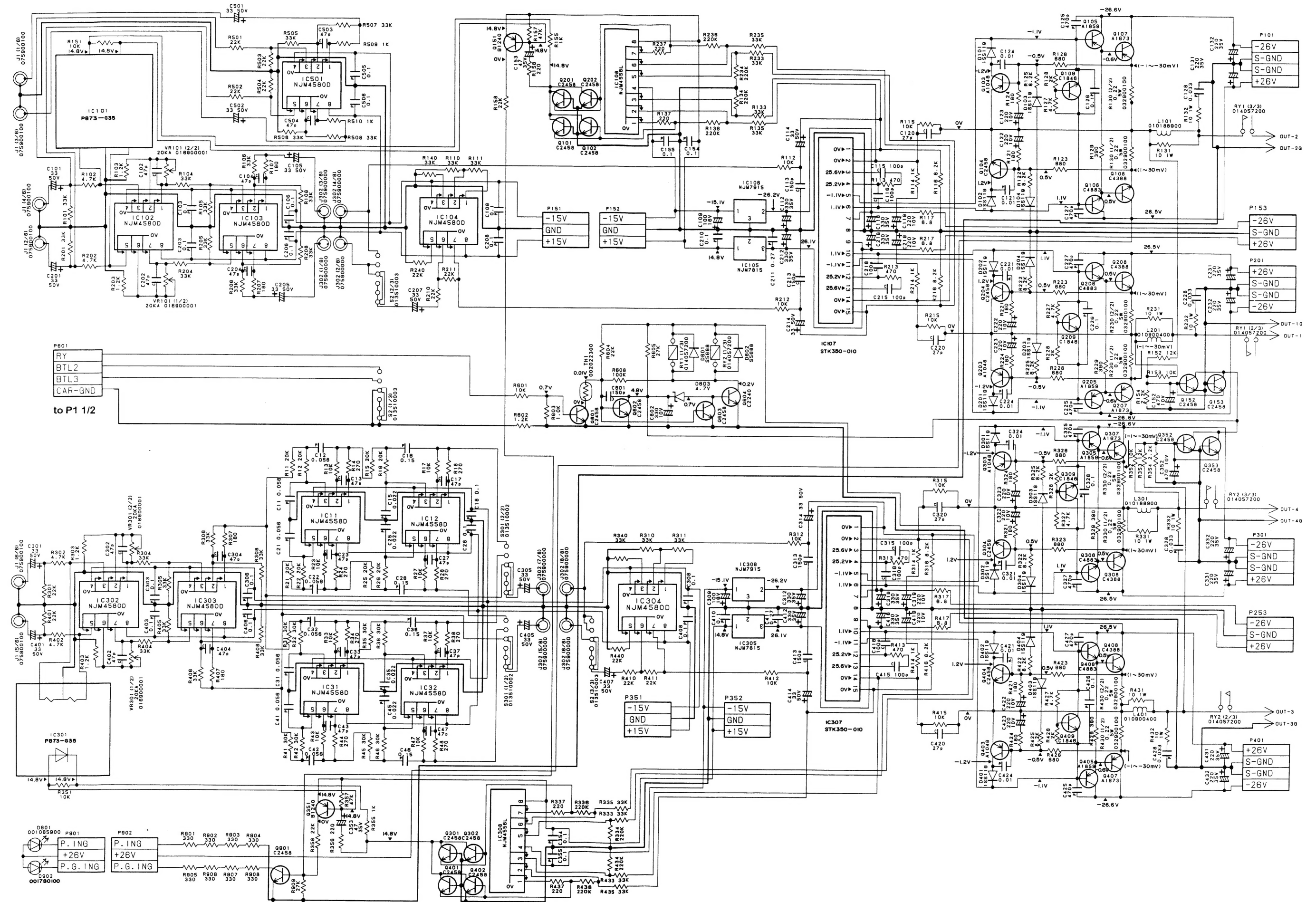
■ CIRCUIT DIAGRAM:1/2 (DDC SECTION)



■ PRINTED WIRING BOARD:1/2 (DDC P.W.B.)

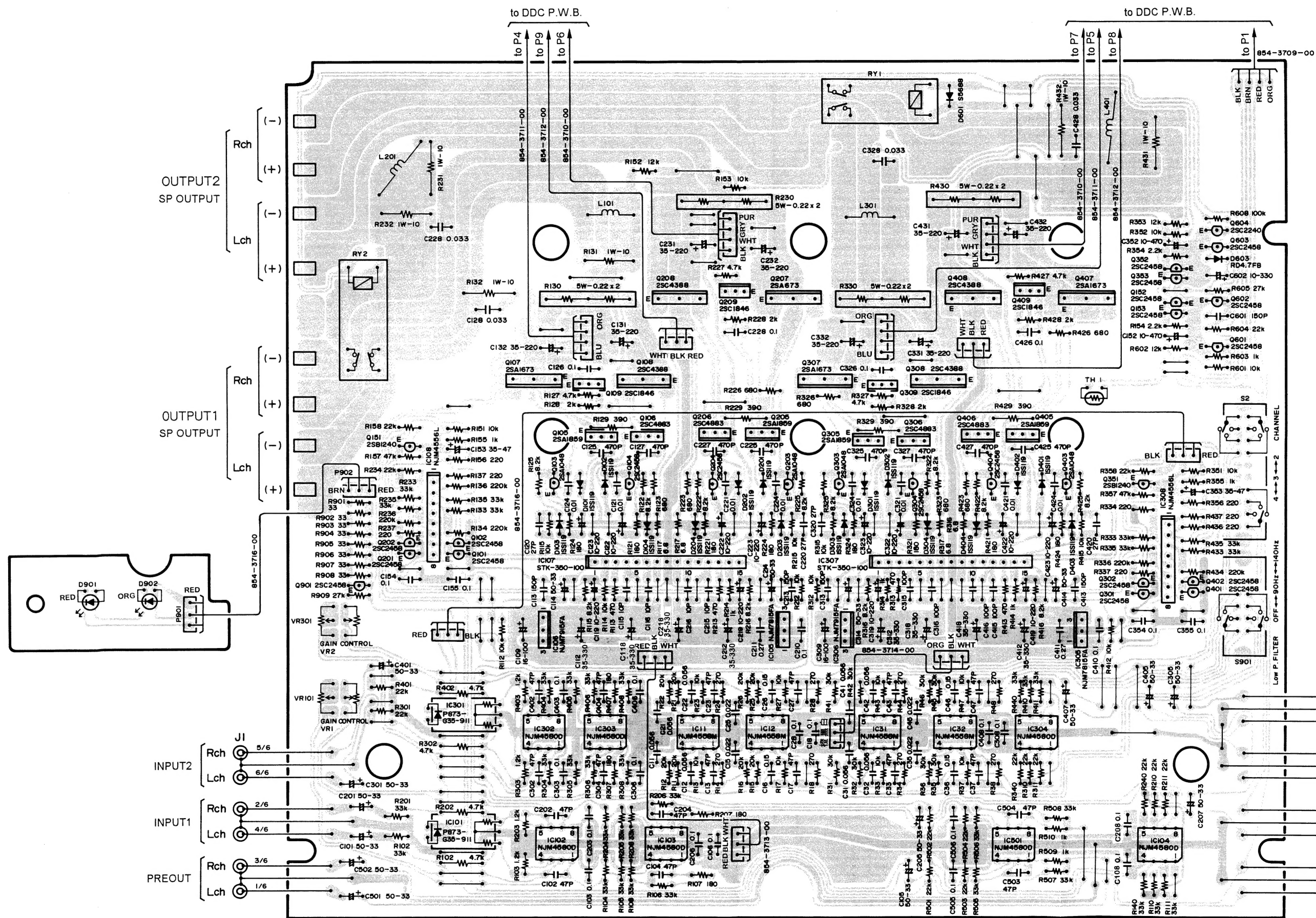


# CIRCUIT DIAGRAM:2/2 (MAIN SECTION)





# PRINTED WIRING BOARD:2/2 (MAIN P.W.B.)



## ■ PARTS LIST

### MAIN PWB

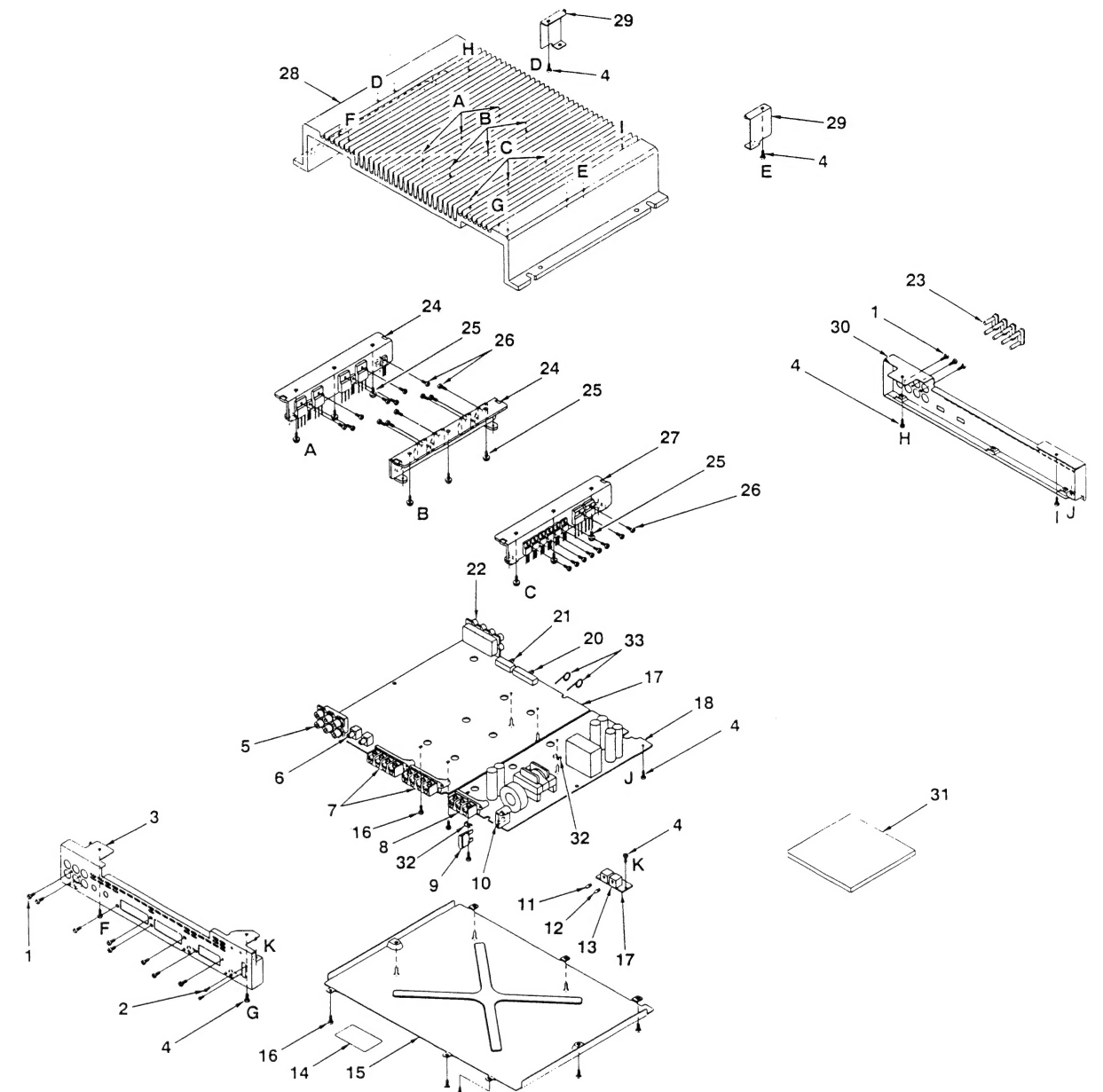
NO.	PART NO.	DESCRIPTION	Q'TY	NO.	PART NO.	DESCRIPTION	Q'TY
D101-104,201-204 301-304,401-404	001-0330-00	DIODE 1SS119	16	C121,124,221,224 321,324,421,424	172-1031-11	POLY-C 0.01uF J	8
D601,602	001-0466-00	DIODE S5688B	1	C18,28,103,106 108,126,154,155 203,206,208,210 224,303,306,308 326,354,355,403 406,408,410,426 505,506	172-1041-11	POLY-C 0.1uF J	26
D603	001-0587-18	DIODE RD4.7FB	1	C16,26,36,46	172-1541-11	POLY-C 0.15uF J	4
D901	001-0659-00	DIODE SLP-181B51 RED	1	C15,25,35,45	172-2231-11	POLY-C 0.022uF J	4
D902	001-7801-00	DIODE SLP-281B51 GRN	1	C211,411	172-2741-11	POLY-C 0.27uF J	2
IC11,12,31,32	051-0422-51	IC NJM4558D	4	C128,228,328,428	172-3331-11	POLY-C 0.033uF J	4
IC108,308	051-1407-00	IC NJM4556L	2	C11,12,21,22,31 32,41,42	172-5631-11	POLY-C 0.056uF J	8
IC105,305	051-1160-00	IC NJM7815FA	2	C125,127,225,227 325,327,425,427	173-4712-10	POLY-C 470pF J	8
IC106,306	051-1306-00	IC NJM7915FM	2	C120,220,320,420	174-2700-13	CERA-C 27pF CH	4
IC101,301	051-1807-00	IC P873-G35-911	2	C13,17,23,27,33 37,43,47,102 104,202,204,302 304,402,404,503 504	174-4700-13	CERA-C 47pF CH	18
IC107,307	051-2201-00	IC STK350-010	2	C109,309	184-1073-31	ELEC-C 16V 100uF	2
IC102-104,302-304 501	051-3001-00	IC NJM4580D	7	C119,122,123,219 222,223,319,322 323,419,422,423	184-2273-21	ELEC-C 10V 220uF	12
Q103,203,303,403	100-1048-00	TR 2SA1048	4	C101,105,114,201 205,207,214,301 305,314,401,405 407,414,501,502	184-3363-61	ELEC-C 50V 33uF	16
Q107,207,307,407	100-1673-00	TR 2SA1673	4	C602	184-3373-21	ELEC-C 10V 330uF	1
Q105,205,305,405	100-1859-00	TR 2SA1859	4	C112,118,212,218 312,318,412,418	184-3373-51	ELEC-C 35V 330uF	8
Q151,351	101-1240-00	TR 2SB1240	2	C153,353	184-4763-51	ELEC-C 35V 47uF	2
Q109,209,309,409	102-1846-00	TR 2SC1846	4	C152,352	184-4773-21	ELEC-C 10V 470uF	2
Q604	102-2240-27	TR 2SC2240BL	1				
Q101,102,104,152 153,201,202,204 301,302,304,352 353,401,402,404 601-603,901	102-2458-00	TR 2SC2458	20				
Q108,208,308,408	102-4388-00	TR 2SC4388	4				
Q106,206,306,406	102-4883-00	TR 2SC4883	4				
TH1	002-0223-00	THERMISTOR	1				
L101,301	010-1889-00	COIL	2				
L201,401	010-9004-00	COIL	2				
RY1,2	014-0572-00	RELAY	2				
R130,230,330,430	032-9001-00	CEMENT-R 5W 0.22 ohm	4				
R131,132,231,232 331,332,431,432	032-9002-03	METAL-R 1W 10 ohm	8				
C131,132,231,232 331,332,431,432	042-0536-00	ELEC-C 35V 220uF	8				
C115,116	160-1012-05	CERA-C 100pF K,B	2				
C113,213	160-1512-05	CERA-C 150pF K,B	2				

### DDC PWB

NO.	PART NO.	DESCRIPTION	Q'TY	NO.	PART NO.	DESCRIPTION	Q'TY
D2,4,5	001-0330-00	DIODE 1SS119	3	R28	032-9002-00	METAL-R 2W 82 ohm	1
D3	001-0377-00	DIODE MA4180H	1	R27	032-9002-01	METAL-R 2W 8.2ohm	1
D1	001-0592-00	DIODE RM-4Z	1	C2,3	042-0535-03	ELEC-C 16V 6800uF	2
D6	001-0653-0A	DIODE FMG32S	1	C17-20	042-0535-04	ELEC-C 35V 3300uF	4
D7	001-0653-0B	DIODE FMG32R	1	C24	043-0174-00	POLYP-C 100V 2200pF	1
IC1	051-3602-00	IC TL598	1	C1,8,10,12,15 16,90	172-1041-11	POLY-C 0.1uF J	7
Q10	100-1048-00	TR 2SA1048	1	C13	172-2231-11	POLY-C 0.022uF J	1
Q3	101-1240-00	TR 2SB1240	1	C19	173-1022-10	POLY-C 1000pF K	1
Q1,2	103-2458-00	TR 2SC2458	2	C6	173-4712-10	POLY-C 470pF K	1
Q4-9	125-8004-00	TR 30NOHD	6	C4	182-2253-52	ELEC-C 50V 2.2uF	1
T1	007-1125-00	OUTPUT TRANS	1	C5	184-1073-11	ELEC-C 16V 100uF	1
L2	009-0669-00	CHOKE COIL	1	C7,11	184-3363-61	ELEC-C 50V 3uF	
L1	010-9002-00	COIL	1				

APA4200

## ■ EXPLODED VIEW • PARTS LIST



NO.	PART NO.	DESCRIPTION	Q'TY	NO.	PART NO.	DESCRIPTION	Q'TY
1	702-3008-89	TAP SCREW M3x8	11	18	039-0310-00	PWB	1
2	702-2006-19	TAP SCREW M2x6	2	19	716-1702-00	SCREW M3x6	2
3	309-0654-00	FRONT PLATE	1	20	013-5100-03	SWITCH	1
4	714-3004-81	MACHINE SCREW M3x4	8	21	013-5100-02	SWITCH	1
5	075-9001-00	PIN JACK 6P	1	22	075-9000-00	PIN JACK 8P	1
6	016-9000-01	VARIABLE RESISTOR	2	23	076-0491-00	PLUG	4
7	073-0722-03	TERMINAL	2	24	313-1600-00	HEAT SINK	2
8	073-0722-02	TERMINAL	1	25	735-3008-11	D-SEMS SCREW M3x8	9
9	060-0057-60	AUTO FUSE 30A	1	26	732-3010-11	SEMS SCREW M3x10	21
10	077-0091-00	FUSE RECEPTACLE	1	27	313-1599-00	HEAT SINK	1
11	001-7801-00	LED GREEN	1	28	313-1622-01	HEAT SINK GA-952B	1
12	001-0659-00	LED RED	1		313-1623-01	GA-952E	
13	335-4481-00	LED HOLDER	2	29	331-0511-00	PWB HOLDER	2
14	286-0010-U01	SET PLATE GA-952B	1	30	307-0495-00	REAR COVER	1
	286-8053-OJ	GA-952E		31	345-7585-00	CUSHION	1
15	304-0433-00	LOWER CASE	1	32	073-0689-00	TERMINAL	2
16	714-3006-89	MACHINE SCREW M3x6	12	33	335-0833-01	LEAD HOLDER	2
17	039-0311-00	PWB	1				

APA4200